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     (FILE 'HOME' ENTERED AT 15:55:44 ON 09 JUN 2005)

     FILE 'STNGUIDE' ENTERED AT 15:55:56 ON 09 JUN 2005

     FILE 'REGISTRY' ENTERED AT 15:56:57 ON 09 JUN 2005
L1              1 S GLYCERALDEHYDE/CN
L2              1 S PROPANONE/CN
L3              1 S BUTANONE/CN
L4              1 S PENTANONE/CN

     FILE 'CAPLUS' ENTERED AT 15:58:02 ON 09 JUN 2005
L5            153 S (L1 OR L2 OR L3 OR L4) AND FUEL (W) CELL
L6              2 S L1  AND FUEL (W) CELL
L7              1 S (L1 OR L2 OR L3 OR L4) AND FUEL (W) CELL AND DIRECT (W) OXIDA

     FILE 'STNGUIDE' ENTERED AT 16:05:00 ON 09 JUN 2005
L8              0 S (L1 OR L2 OR L3 OR L4) AND FUEL (W) CELL AND DIRECT

     FILE 'CAPLUS' ENTERED AT 16:07:22 ON 09 JUN 2005
L9             10 S (L1 OR L2 OR L3 OR L4) AND FUEL (W) CELL AND DIRECT
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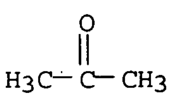
=> d ibib hitstr kwic 1-10

L9 ANSWER 1 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN BD

ACCESSION NUMBER: 2004:938514 CAPLUS
DOCUMENT NUMBER: 142:117494
TITLE: Characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC)
AUTHOR(S): Cho, Ki-Yun; Eom, Ji-Yong; Jung, Ho-Young; Choi, Nam-Soon; Lee, Yong Min; Park, Jung-Ki; Choi, Jong-Ho; Park, Kyung-Won; Sung, Yung-Eun
CORPORATE SOURCE: Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology, Daejon, 305-701, S. Korea
SOURCE: Electrochimica Acta (2004), 50(2-3), 583-588
CODEN: ELCAAV; ISSN: 0013-4686
PUBLISHER: Elsevier B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

IT **67-64-1**, Acetone, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(blend casting solvent; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

TI Characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC)

AB For **direct** methanol **fuel cell**, blends of vinylidene fluoride-hexafluoropropylene copolymer (P(VdF-co-HFP)) and Nafion were prepared the different equivalent weight of Nafion. The studies of the blend morphol. were performed by permeability test, uptake measurement, differential-scanning calorimetry (DSC), and SEM. In the blend membranes, many pores were created as the content of Nafion in blend increased. Then, the methanol uptake was sharply increased. But the methanol permeability was not sharply increased because the methanol permeation through blend membranes is diffusion-controlled process. The methanol permeability of N10 (low equivalent weight) series was similar to that of N11 series (high equivalent weight). The proton conductivity of N10 series was around one and a half times higher than that of N11 series. The cell performance of the blend was much enhanced when the equivalent weight of Nafion was 1000.

ST fluoropolymer Nafion blend polymer electrolyte membrane methanol **fuel cell**; **fuel cell** electrolyte permeability vinylidene fluoride hexafluoropropene copolymer Nafion

IT **Fuel cell** electrolytes
(characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(fluorine- and sulfo-containing, ionomers, acid form, in electrolyte blends; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Polymer blends
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(in polymer electrolytes; characteristics of PVdF copolymer/Nafion

blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Absorption
(of methanol or water; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Permeability
(of methanol through polymer blend electrolytes; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Electric current-potential relationship
(of polarization tests with assembled **fuel cells**; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT **Fuel cells**
(polymer electrolyte; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Fluoropolymers, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, acid form, in electrolyte blends; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Ionomers
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, acid form, in electrolyte blends; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT Ionic conductivity
(proton, of polymer blend electrolytes; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT 7732-18-5, Water, processes
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(absorption; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT **67-64-1**, Acetone, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(blend casting solvent; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT 67-56-1, Methanol, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

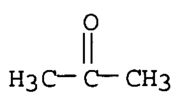
IT 66796-30-3, Nafion 117
RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

IT 9011-17-0, Kynar Flex 2751
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(in electrolyte blends; characteristics of PVdF copolymer/Nafion blend membrane for **direct** methanol **fuel cell** (DMFC))

L9 ANSWER 2 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:850811 CAPLUS
DOCUMENT NUMBER: 142:29212
TITLE: AC-impedance spectroscopy of anodic reactions with adsorbed intermediates: electro-oxidations of 2-propanol and methanol on carbon-supported Pt catalyst
AUTHOR(S): Otomo, Junichiro; Li, Xiaoen; Kobayashi, Takeshi; Wen, Ching-ju; Nagamoto, Hidetoshi; Takahashi, Hiroshi
CORPORATE SOURCE: Department of Environmental Chemical Engineering, Faculty of Engineering, Kogakuin University, Hachioji, Tokyo, 192-0015, Japan
SOURCE: Journal of Electroanalytical Chemistry (2004), 573(1), 99-109
CODEN: JECHES
PUBLISHER: Elsevier B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

IT **67-64-1**, Acetone, properties
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(formation in electrooxidn. of isopropanol and electrooxidn. of isopropanol and methanol on carbon-supported Pt catalyst and impedance spectroscopy of anodic reactions with adsorbed intermediates)
RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

AB The a.c.-impedance spectroscopy of the electrooxidn. of iso-PrOH and MeOH was studied in a H_2SO_4 solution using a C-supported Pt catalyst as a function of potential between 350 and 750 mV (vs. SHE) at a variety of temps. between 303 and 353 K. The impedance spectrum of iso-PrOH is very similar to that of MeOH. Semicircles that have induction loops at the low frequency ends were observed in complex plane plots at high potentials between 600 and 750 mV in both the cases of iso-PrOH and MeOH, which suggests that the rate-determining steps of the electrooxidn. of intermediates adsorbed on Pt should be involved in their reaction processes. Assuming appropriate models involving the adsorbed intermediates for iso-PrOH and MeOH, the impedance spectra were explained successfully. The impedance anal. provides the values of reaction parameters concerning a coverage relaxation time for an intermediate and a charge-transfer resistance, which make it possible to compare the reaction rates of the intermediates between iso-PrOH and MeOH. The reaction parameters suggest that a consecutive reaction involving the intermediate for iso-PrOH proceeds more slowly than that for MeOH, and also suggest that a **direct** reaction pathway from iso-PrOH to acetone, which does not go through the intermediate, exists in parallel. Addnl., the influences of acetone concentration on the coverage relaxation time and the charge-transfer resistance for the electrooxidn. of iso-PrOH are also discussed.

IT **Fuel cells**
(electrochem. oxidation of isopropanol and methanol on carbon-supported Pt catalyst and impedance spectroscopy of anodic reactions with adsorbed intermediates in relation to)

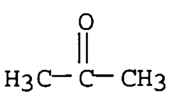
IT **67-64-1**, Acetone, properties
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(formation in electrooxidn. of isopropanol and electrooxidn. of isopropanol and methanol on carbon-supported Pt catalyst and impedance spectroscopy of anodic reactions with adsorbed intermediates)

80

ACCESSION NUMBER: 2004:353013 CAPLUS
DOCUMENT NUMBER: 140:342222
TITLE: Membrane-electrode assembly of **fuel cell**, its production method and **fuel cell** employing the same
INVENTOR(S): Kim, Hae-Kyoung; Kim, Ji-Rae
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea
SOURCE: U.S. Pat. Appl. Publ., 7 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2004081877	A1	20040429	US 2003-449776		20030602
JP 2004146367	A2	20040520	JP 2003-317964		20030910
PRIORITY APPLN. INFO.:			KR 2002-65659	A	20021026

IT **67-64-1**, Acetone, uses
RL: NUU (Other use, unclassified); USES (Uses)
(solvent; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)
RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



TI Membrane-electrode assembly of **fuel cell**, its production method and **fuel cell** employing the same
AB A method for producing a membrane and electrode assembly (MEA) of a **fuel cell** comprises forming a catalyst composition by mixing a polymeric ionomer, an alc. solvent, and a polar organic solvent having b.p. 30-200° with a metal catalyst; coating the composition on both surfaces of a polymer electrolyte membrane to form electrode catalyst layers; and arranging electrode supports on the electrode catalyst layers. Thus, Pt-Ru, Nafion ionomer, and iso-Pr alc. were mixed with THF under stirring to form a catalyst composition, a polymer electrolyte membrane was spray-coated on both surfaces with this composition, and a carbon paper as an electrode support was arranged on the electrode catalyst layers to form an MEA of **fuel cell.** Thereafter, a **fuel cell** was completed by using such MEAs.
ST platinum ruthenium catalyst membrane electrode assembly **fuel cell**; Nafion ionomer catalyst layer membrane electrode assembly **fuel cell**; carbon paper catalyst layer membrane electrode assembly **fuel cell**
IT Ionomers
RL: TEM (Technical or engineered material use); USES (Uses)
(Nafion; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)
IT Copying paper
(carbon paper; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)
IT Metals, uses
RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)
(catalyst layer; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)
IT **Fuel cells**

(**direct** methanol; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Fluoropolymers, uses
Polyamides, uses
Polybenzimidazoles
Polyesters, uses
Polyimides, uses
Polyoxyphenylenes
Polysulfones, uses
Polythiophenylenes
RL: TEM (Technical or engineered material use); USES (Uses)
(membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Polyketones
Polysulfones, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyether-, membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Polyethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyketone-, membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Membrane electrodes
(polymeric; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polymers, sulfonated, membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Polyethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polysulfone-, membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT Alcohols, uses
RL: NUU (Other use, unclassified); USES (Uses)
(solvent; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT 9020-32-0
RL: TEM (Technical or engineered material use); USES (Uses)
(assumed monomers, membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

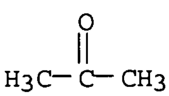
IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-16-6, Rhodium, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-67-7, Zirconium, uses 12779-05-4
RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)
(catalyst layer; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT 9020-73-9, Polyethylenenaphthalate 24937-79-9, Polyvinylidene fluoride 77950-55-1, Nafion 115
RL: TEM (Technical or engineered material use); USES (Uses)
(membrane; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

IT 60-29-7, Diethylether, uses 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, Isopropyl alcohol, uses **67-64-1**, Acetone, uses

67-66-3, Chloroform, uses 67-68-5, Dimethylsulfoxide, uses 68-12-2, Dimethylformamide, uses 109-99-9, Tetrahydrofuran, uses 141-78-6, Ethylacetate, uses
RL: NUU (Other use, unclassified); USES (Uses)
(solvent; membrane-electrode assembly having electrode catalyst layers for **fuel cell**, production method and **fuel cell** employing same)

L9 ANSWER 4 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN BP.
ACCESSION NUMBER: 2003:699610 CAPLUS
DOCUMENT NUMBER: 140:114077
TITLE: A **direct** 2-propanol polymer electrolyte **fuel cell**
AUTHOR(S): Cao, Dianxue; Bergens, Steven H.
CORPORATE SOURCE: Department of Chemistry, University of Alberta, Edmonton, AB, T6G 2G2, Can.
SOURCE: Journal of Power Sources (2003), 124(1), 12-17
CODEN: JPSODZ; ISSN: 0378-7753
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
IT **67-64-1**, Acetone, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(from isopropanol decomposition; **direct** 2-propanol polymer electrolyte **fuel cell** with Nafion separator)
RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT
TI A **direct** 2-propanol polymer electrolyte **fuel cell**
AB The authors report the performance of a polymer electrolyte membrane **direct** 2-propanol **fuel cell** (DPFC). The cell consisted of a Pt-Ru (atomic ratio of 1:1) black anode, a Pt black cathode, and a Nafion-117 membrane electrolyte. The cell was operated at 90° with aqueous 2-propanol as fuel and with oxygen as oxidant. The performance of the cell operating on 2-propanol is substantially higher than when it was operating on methanol at current densities .ltorsim.200 mA/cm2. The elec. efficiency of the **direct** 2-propanol **fuel cell** is nearly 1.5 times that of the **direct** methanol **fuel cell** at power densities <128 mW/cm2. Studies on the effects of electrocatalyst loading, of 2-propanol concentration, and of oxygen pressure on cell performance indicate that the cells operating on 2-propanol require lower anode and cathode loadings than cells operating on methanol. Cathode poisoning by 2-propanol is less severe than by methanol. Hydrogen gas evolution observed at the anode at low current densities indicated that catalytic dehydrogenation of 2-propanol occurred over the anode catalyst. A rapid voltage drop occurred at high current densities and after operating the cell for extended periods of time at constant current. The rapid voltage drop is an anode phenomenon.
ST isopropanol polymer electrolyte separator platinum ruthenium electrode **fuel cell**
IT Electric potential
Fuel cell electrodes
Fuel cells
Polymer electrolytes
(**direct** 2-propanol polymer electrolyte **fuel cell** with Nafion separator)
IT Current density
(effect on **fuel cell** voltage; **direct**

2-propanol polymer electrolyte **fuel cell** with
Nafion separator)
IT Membranes, nonbiological
(elec. conductive; **direct** 2-propanol polymer electrolyte
fuel cell with Nafion separator)
IT Catalysts
(electrocatalysts; **direct** 2-propanol polymer electrolyte
fuel cell with Nafion separator)
IT Fluoropolymers, uses
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(electrode support; **direct** 2-propanol polymer electrolyte
fuel cell with Nafion separator)
IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(fluorine- and sulfo-containing, ionomers, electrode catalyst ink with
HiSPEC 6000; **direct** 2-propanol polymer electrolyte
fuel cell with Nafion separator)
IT Electric current-potential relationship
(of **fuel cell** assemblies; **direct**
2-propanol polymer electrolyte **fuel cell** with
Nafion separator)
IT Dehydrogenation
(oxidative, of isopropanol at anode; **direct** 2-propanol
polymer electrolyte **fuel cell** with Nafion
separator)
IT Fluoropolymers, uses
RL: DEV (Device component use); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, electrode catalyst ink with
HiSPEC 6000; **direct** 2-propanol polymer electrolyte
fuel cell with Nafion separator)
IT Ionomers
RL: DEV (Device component use); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, electrode catalyst ink
with HiSPEC 6000; **direct** 2-propanol polymer electrolyte
fuel cell with Nafion separator)
IT Electric energy
(power d. and efficiency of **fuel cells**;
direct 2-propanol polymer electrolyte **fuel**
cell with Nafion separator)
IT 647838-24-2, Hispec 6000
RL: DEV (Device component use); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(anode catalyst composite with Nafion; **direct** 2-propanol
polymer electrolyte **fuel cell** with Nafion
separator)
IT 7440-06-4, Platinum black, uses
RL: DEV (Device component use); USES (Uses)
(cathode composite with Nafion; **direct** 2-propanol polymer
electrolyte **fuel cell** with Nafion separator)
IT 66796-30-3, Nafion-117
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(**direct** 2-propanol polymer electrolyte **fuel**
cell with Nafion separator)
IT 67-56-1, Methanol, uses 67-63-0, 2-Propanol, uses
RL: PRP (Properties); RCT (Reactant); TEM (Technical or engineered
material use); RACT (Reactant or reagent); USES (Uses)
(**direct** 2-propanol polymer electrolyte **fuel**
cell with Nafion separator)
IT 7782-44-7, Oxygen, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(**direct** 2-propanol polymer electrolyte **fuel**
cell with Nafion separator)
IT 9002-84-0, Teflon

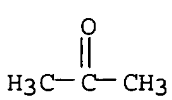
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(electrode support; **direct** 2-propanol polymer electrolyte **fuel cell** with Nafion separator)
IT **67-64-1**, Acetone, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(from isopropanol decomposition; **direct** 2-propanol polymer electrolyte **fuel cell** with Nafion separator)
IT 1333-74-0, Hydrogen, reactions
RL: FMU (Formation, unclassified); RCT (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or reagent)
(from isopropanol decomposition; **direct** 2-propanol polymer electrolyte **fuel cell** with Nafion separator)

L9 ANSWER 5 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN — Not rel.

ACCESSION NUMBER: 2003:492507 CAPLUS
DOCUMENT NUMBER: 139:55471
TITLE: **Direct** hydrocarbon **fuel cells**
INVENTOR(S): Barnett, Scott A.; Liu, Jiang
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 39 pp., Cont.-in-part of U.S. Ser. No. 833,209.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 4
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2003118879	A1	20030626	US 2002-277167		20021021
US 6214485	B1	20010410	US 1999-441104		19991116
US 2002098401	A1	20020725	US 2001-833209		20010410
US 6479178	B2	20021112			
PRIORITY APPLN. INFO.:			US 1999-441104	A2	19991116
			US 2001-833209	A2	20010410

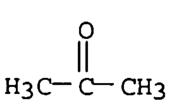
IT **67-64-1**, Acetone, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



TI **Direct** hydrocarbon **fuel cells**
AB A method of using a hydrocarbon fuel to operate a solid oxide **fuel cell**, such a cell comprising one or more components which can be prepared using a centrifugal deposition technique of the type described herein.
ST **fuel cell direct** hydrocarbon fuel
IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(C1-10; **direct** hydrocarbon **fuel cells**)
IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
IT Natural gas, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
IT **Fuel cells**
(solid oxide; **direct** hydrocarbon **fuel cells**
)

IT 74-84-0, Ethane, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
IT 7440-02-0, Nickel, uses 12013-47-7, Calcium zirconium oxide 12017-94-6, Chromium lanthanum oxide crlao3 51184-16-8, Cerium yttrium oxide 59707-46-9, Lanthanum manganese strontium oxide 64417-98-7, Yttrium zirconium oxide 108916-22-9, Lanthanum manganese strontium oxide La0.8MnSr0.2O3 148595-66-8, Cobalt iron lanthanum strontium oxide Co0.2Fe0.8La0.6Sr0.4O3 175865-42-6, Cobalt iron lanthanum strontium oxide ((Co,Fe)(La,Sr)O3)
RL: DEV (Device component use); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
IT **67-64-1**, Acetone, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
IT 74-82-8, Methane, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**direct** hydrocarbon **fuel cells**)
IT 11129-18-3, Cerium oxide
RL: DEV (Device component use); USES (Uses)
(yttria-doped; **direct** hydrocarbon **fuel cells**)
IT 1314-23-4, Zirconia, uses
RL: DEV (Device component use); USES (Uses)
(yttria-stabilized; **direct** hydrocarbon **fuel cells**)
IT 1314-36-9, Yttria, uses
RL: DEV (Device component use); USES (Uses)
(zirconia stabilized with; **direct** hydrocarbon **fuel cells**)
IT 7440-70-2, Calcium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(zirconia stabilized with; **direct** hydrocarbon **fuel cells**)

L9 ANSWER 6 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2002:951792 CAPLUS
DOCUMENT NUMBER: 138:240495
TITLE: **Direct** 2-propanol **fuel cell**-current-voltage characteristics and reaction product at room temperature operation
AUTHOR(S): Umeda, Minoru; Sugii, Hiromasa; Mohamedi, Mohamed; Uchida, Isamu
CORPORATE SOURCE: Department of Chemistry, Faculty of Engineering, Nagaoka University of Technology, Kami-Tomioka, Nagaoka, Niigata, 940-2188, Japan
SOURCE: Electrochemistry (Tokyo, Japan) (2002), 70(12), 961-963
CODEN: EECTFA; ISSN: 1344-3542
PUBLISHER: Electrochemical Society of Japan
DOCUMENT TYPE: Journal
LANGUAGE: English
IT **67-64-1**, Acetone, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(**direct** 2-propanol **fuel cell** -current-voltage characteristics and reaction product at room temperature operation)
RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

TI **Direct** 2-propanol **fuel cell**-current-voltage characteristics and reaction product at room temperature operation

AB The authors have studied the electrochem. performance of a **direct** 2-propanol **fuel cell** (D2PFC) having a Pt5:Ru5 anode comparatively with those using primary alcs. at room temperature First, cyclic voltammograms of the alcs. were recorded in aqueous solution at a Pt-Ru sputtered electrode in an atomic ratio of 50:50. As a result, 2-propanol exhibited (i) the most cathodic potential where the oxidation current starts, and (ii) the largest c.d. Next, by employing a single cell with an anode catalyst of the same Pt-Ru composition, the I-V properties of 0.5 mol dm-3 fuel concentration exhibited similar trend as observed in CVs. However, methanol exceeds 2-propanol at high power operation. The inversion phenomenon is proven to be an accumulation of acetone, which is the only oxidation product of 2-propanol around the anode surface. By using a concentrated fuel of 5 mol dm-3, **direct** 2-propanol **fuel cell** exceeded **direct** methanol **fuel cell** even at high power operation. 2-Propanol could advantageously substitute for methanol as a high-power fuel in a **fuel cell** at room temperature operation.

ST propanol **fuel cell** current voltage methanol alc electrooxidn

IT Current density
Electric current-potential relationship
Fuel cells
(**direct** 2-propanol **fuel cell** -current-voltage characteristics and reaction product at room temperature operation)

IT Oxidation, electrochemical
(of alcs.; **direct** 2-propanol **fuel cell** -current-voltage characteristics and reaction product at room temperature operation)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, 2-Propanol, uses 71-23-8, 1-Propanol, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**direct** 2-propanol **fuel cell** -current-voltage characteristics and reaction product at room temperature operation)

IT **67-64-1**, Acetone, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(**direct** 2-propanol **fuel cell** -current-voltage characteristics and reaction product at room temperature operation)

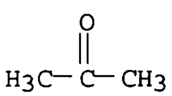
IT 172515-31-0P, Platinum, compound with ruthenium (1:1)
RL: DEV (Device component use); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(sputtered alloy electrode; **direct** 2-propanol **fuel cell**-current-voltage characteristics and reaction product at room temperature operation)

L9 ANSWER 7 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN B.D.

ACCESSION NUMBER: 2002:736549 CAPLUS
DOCUMENT NUMBER: 137:265674
TITLE: **Fuel cell** powered by **direct** fuel
INVENTOR(S): Andrews, Mark James; Lockley, John Edward; Wilson, Brian
PATENT ASSIGNEE(S): Victrex Manufacturing Limited, UK
SOURCE: PCT Int. Appl., 72 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
WO 2002075835	A2	20020926	WO 2002-GB1379		20020321
WO 2002075835	A3	20031016			
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW					
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG					
CA 2440964	AA	20020926	CA 2002-2440964		20020321
EP 1374330	A2	20040102	EP 2002-706992		20020321
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR					
JP 2004528683	T2	20040916	JP 2002-574147		20020321
US 2004157102	A1	20040812	US 2004-472227		20040406
PRIORITY APPLN. INFO.:			GB 2001-7075	A	20010321
			GB 2001-23085	A	20010926
			WO 2002-GB1379	W	20020321

IT **67-64-1**, Acetone, uses
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**fuel cell** powered by **direct** fuel)
RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



TI **Fuel cell** powered by **direct** fuel

AB A **fuel cell** powered by **direct** fuel, for example a **direct** methanol **fuel cell**, includes a polymer electrolyte membrane which includes a semicryst. polymer. Preferred semicryst. polymers include first repeat units comprising sulfonated aromatic group containing moieties linked by -SO2- and/or -CO- and/or -Q-groups, where Q is O or S and second repeat units which include aromatic group containing moieties linked by -CO- and/or Q groups.

ST **fuel cell** power **direct** fuel; methanol **direct** use **fuel cell**

IT Crystallinity
Fuel cell electrolytes
(**fuel cell** powered by **direct** fuel)

IT Polysulfones, uses
RL: DEV (Device component use); USES (Uses)
(polyether-; **fuel cell** powered by **direct** fuel)

IT Polyethers, uses
RL: DEV (Device component use); USES (Uses)
(polysulfone-; **fuel cell** powered by **direct** fuel)

IT Polymers, uses
RL: DEV (Device component use); USES (Uses)
(semicryst., sulfonated; **fuel cell** powered by **direct** fuel)

IT **Fuel cells**
(solid electrolyte; **fuel cell** powered by **direct** fuel)

IT 27380-27-4DP, sulfonated 31694-16-3DP, PEEK 450P, sulfonated

128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated 128324-23-2P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 128324-24-3P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-41-9DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 361482-41-9P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-42-0DP, 4,4'-Difluorobenzophenone-2,4'-dihydroxybenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 361482-42-0P, 4,4'-Difluorobenzophenone-2,4'-dihydroxybenzophenone-4,4'-dihydroxybenzophenone 4,4'-dihydroxybiphenyl copolymer 362518-55-6P 362518-57-8P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(**fuel cell** powered by **direct** fuel)

IT **67-64-1**, Acetone, uses

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(**fuel cell** powered by **direct** fuel)

L9 ANSWER 8 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN NO

ACCESSION NUMBER: 1997:652208 CAPLUS

DOCUMENT NUMBER: 127:320827

TITLE: Proposal and fundamental analysis of thermally regenerative **fuel cell** utilizing solar heat

AUTHOR(S): Ando, Yuji; Doi, Takuya; Takashima, Takumi; Tanaka, Tadayoshi

CORPORATE SOURCE: Electrotechnical Laboratory, Tsukuba, 305, Japan

SOURCE: Proceedings of the Intersociety Energy Conversion Engineering Conference (1997), 32nd, 1860-1864
CODEN: PIECDE; ISSN: 0146-955X

PUBLISHER: Society of Automotive Engineers

DOCUMENT TYPE: Journal

LANGUAGE: English

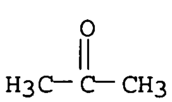
IT **67-64-1**, Acetone, uses

RL: NUU (Other use, unclassified); USES (Uses)

(hydrogenation of; thermally regenerative **fuel cell** utilizing solar heat)

RN 67-64-1 CAPLUS

CN 2-Propanone (9CI) (CA INDEX NAME)



REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

TI Proposal and fundamental analysis of thermally regenerative **fuel cell** utilizing solar heat

AB In Japan, it is difficult to attain high-temperature heat continuously from the sun. However, it is easy to attain low-temperature solar thermal energy. In order to use low-temperature solar energy, we propose use of a thermally regenerative **fuel cell** operated by solar energy. It is a **direct** energy conversion. It consists of 2-propanol dehydrogenation at neg. electrode, acetone hydrogenation at pos. electrode and electrolyte sandwiched by both electrodes. By means of combination with chemical reaction and **fuel cell**, it can convert low temperature thermal energy like solar thermal energy into elec. energy directly. In order to make clear characteristics of our proposed cell, we use mol.

hydrogen as proton source instead of 2-propanol. The activity of ruthenium and platinum composite catalyst supported carbon plate for acetone hydrogenation at 363 K is higher than that of ruthenium or platinum mono-metallic catalyst supported carbon plate. The activity of ruthenium and platinum composite catalyst supported carbon felt or carbon cloth is much higher than carbon-plate-supported catalysts. We adopted a ruthenium and platinum composite catalyst supported carbon felt or cloth as electrodes of the cell and examined its characteristics.

ST solar thermally regenerative **fuel cell**; propanol dehydrogenation acetone hydrogenation **fuel cell**; ruthenium platinum catalyst acetone hydrogenation

IT Hydrogenation catalysts
(Ru-Pt on carbon; thermally regenerative **fuel cell** utilizing solar heat)

IT Hydrogenation
(of acetone; thermally regenerative **fuel cell** utilizing solar heat)

IT Dehydrogenation
(of isopropanol; thermally regenerative **fuel cell** utilizing solar heat)

IT **Fuel cells**
(regenerative **fuel cells**; thermally regenerative **fuel cell** utilizing solar heat)

IT Solar energy
(thermally regenerative **fuel cell** utilizing solar heat)

IT 67-63-0, 2-Propanol, uses
RL: NUU (Other use, unclassified); USES (Uses)
(dehydrogenation od; thermally regenerative **fuel cell** utilizing solar heat)

IT **67-64-1**, Acetone, uses
RL: NUU (Other use, unclassified); USES (Uses)
(hydrogenation of; thermally regenerative **fuel cell** utilizing solar heat)

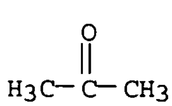
IT 1333-74-0P, Hydrogen, uses
RL: NUU (Other use, unclassified); PNU (Preparation, unclassified); PREP (Preparation); USES (Uses)
(thermally regenerative **fuel cell** utilizing solar heat)

L9 ANSWER 9 OF 10 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1995:993446 CAPLUS
DOCUMENT NUMBER: 124:33684
TITLE: Evaluation of ethanol, 1-propanol, and 2-propanol in a **direct** oxidation polymer-electrolyte **fuel cell.** A real-time mass spectrometry study
AUTHOR(S): Wang, Jiangtao; Wasmus, S.; Savinell, R. F.
CORPORATE SOURCE: Dep. Chemical Engineering, Case Western Reserve Univ., Cleveland, OH, 44106-7218, USA
SOURCE: Journal of the Electrochemical Society (1995), 142(12), 4218-24
CODEN: JESOAN; ISSN: 0013-4651
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

IT **67-64-1**, Acetone, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(evaluation of ethanol and 1-propanol and 2-propanol in a **direct** oxidation polymer-electrolyte **fuel cell**
)

RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



TI Evaluation of ethanol, 1-propanol, and 2-propanol in a **direct** oxidation polymer-electrolyte **fuel cell.** A real-time mass spectrometry study

AB Ethanol, 1-propanol, and 2-propanol have been evaluated as alternative fuels for **direct** methanol/oxygen **fuel cells.** The relative product distributions for the electro-oxidation of these alcs. under **fuel-cell** conditions were determined using online mass spectrometry. For water/ethanol mole ratios between 5 and 2, ethanal is the main product, while CO2 is a minor product. However, an increase of the water/ethanol mole ratio increased the relative product distribution of CO2 slightly. Propanal was the main product of the electro-oxidation of 1-propanol with a similar percentage of CO2 being formed as for ethanol. In contrast, the electro-oxidation of 2-propanol yielded practically only acetone. Between 150 and 190°, the product distributions for the electro-oxidation of ethanol, 1-propanol, and 2-propanol do not depend significantly on the temperature No differences in the product selectivities of Pt-Ru and Pt-black were found. Ethanol is a promising alternative fuel for **direct** methanol **fuel cells** (DMFCs) with an electrochem. activity comparable to that of methanol. Conversely, 1-propanol and 2-propanol are not suitable as fuels for DMFCs due to their low electrochem. activity.

ST polymer electrolyte **fuel cell** ethanol fuel; propanol fuel polymer electrolyte **fuel cell**

IT **Fuel cells**
Oxidation, electrochemical
(evaluation of ethanol and 1-propanol and 2-propanol in a **direct** oxidation polymer-electrolyte **fuel cell**)

IT 64-19-7, Acetic acid, formation (nonpreparative) **67-64-1**, Acetone, formation (nonpreparative) 75-07-0, Ethanal, formation (nonpreparative) 79-09-4, Propionic acid, formation (nonpreparative) 123-38-6, Propanal, formation (nonpreparative) 124-38-9, Carbon dioxide, formation (nonpreparative) 141-78-6, Ethyl acetate, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(evaluation of ethanol and 1-propanol and 2-propanol in a **direct** oxidation polymer-electrolyte **fuel cell**)

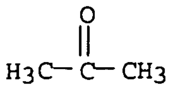
IT 64-17-5, Ethanol, uses 67-63-0, 2-Propanol, uses 71-23-8, 1-Propanol, uses
RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
(fuel; evaluation of ethanol and 1-propanol and 2-propanol in a **direct** oxidation polymer-electrolyte **fuel cell**)

L9 ANSWER 10 OF 10 CAPLUS

ACCESSION NUMBER: 1964:423098 CAPLUS
DOCUMENT NUMBER: 61:23098
ORIGINAL REFERENCE NO.: 61:3913b-e
TITLE: Anodic oxidation of propane and C3 compounds in acid solution on the platinum electrode
AUTHOR(S): Bianchi, Giuseppe; Longhi, Paolo
CORPORATE SOURCE: Univ. Milan
SOURCE: Chimica e l'Industria (Milan, Italy) (1964), 46(5), 501-8
CODEN: CINMAB; ISSN: 0009-4315
DOCUMENT TYPE: Journal
LANGUAGE: Unavailable

IT **67-64-1**, Acetone
(oxidation of, on Pt-graphite anodes in **fuel cells**)

RN 67-64-1 CAPLUS
CN 2-Propanone (9CI) (CA INDEX NAME)



AB Anodic oxidation of various C3 derivs. was carried out in 0.5M H2SO4 with a Pt black/graphite electrode in a special **fuel cell.** Gas flow in the upper chamber of the cell was 15 ml./min. when C3H8 or C3H6 were fed, while liquids were fed in a stream of pure N saturated with their vapors at 25°. Decay curves, current as a function of time, and constant potential polarization curves were measured. A saturated AgCl reference electrode was used to establish normal H scale (NHS) by addition of 0.197 v. to the values obtained. To obtain decay curves, O was formed and adsorbed at the anode at selected potentials, and the circuit was opened to observe the fall of the potential with time for various fuels. With 0.9 v., reactivity decreased in the order C2H5CHO, PrOH, iso-PrOH, Me2CO, propylene glycol (I), C3H6, C3H8, and C2H5CO2H. With 0.4 v., the order was iso-PrOH, I, C2H5CHO or PrOH, C3H8, C2H5CO2H, C3H6, and Me2CO. With 1.5 v., the order changed to iso-PrOH, PrOH, C2H5CHO, Me2CO, C3H6, I, C3H8, and C2H5CO2H. Current fell off asymptotically to a limiting value in all cases, indicating a reformation of the O film. With the electrode at equilibrium, reactivity falls off in the order: iso-PrOH, I, C2H5CHO or PrOH, C3H8, C2H5CO2H, C3H6, and Me2CO. Except with a potential of 0.4 v., the reactivity of C3H8 appeared to be the same for the entire potential range from 0.5 to 0.8 v. A deactivating film of C3H6 seems to predominate on the electrode at 0.4 v. (Grubb and Niedrach, CA 60, 3715c). The reactivity of C3H8 was nearly the same with potentials of 0.9 to 1.2 v., but with 1.5 v. it is increased owing to the **direct** evolution of O on the Pt black. Because of their poor reactivity, C2H5CO2H and Me2CO are not considered to act as intermediates. At levels from 0.5 to 0.8 v., the rate of reaction may be governed by the higher adsorption of C3H6 over C3H8. Above 0.9 v. to 1.3 v. the reaction is governed by the dehydrogenation rate of C3H8 at free active centers. At 1.5 v., C3H8 is not reacted as the electrode is covered with O. Differences in anodic oxidation are observed, depending on the ability of the fuel to react directly with the adsorbed O or not.

IT 57-55-6, 1,2-Propanediol 67-63-0, Isopropyl alcohol **67-64-1**, Acetone 71-23-8, Propyl alcohol 74-98-6, Propane 79-09-4, Propionic acid 115-07-1, Propene 123-38-6, Propionaldehyde
(oxidation of, on Pt-graphite anodes in **fuel cells**)